



Course title: **Advanced Satellite Remote Sensing**

ECTS credit allocation (and other scores): 2

Semester: spring

Level of study: ISCED-6 - first-cycle programmes (EQF-6)

Branch of science: Engineering and technology

Language: English

Number of hours per semester: 45

Course coordinator/ Department and e-mail: **Marek Mróz**, marek.mroz@uwm.edu.pl [French speaking also]

Type of classes: classes and lectures

Substantive content

CLASSES: SAR satellites. Access to SAR data, software tools for SAR image processing. Pre-processing of Sentinel-1 data. Calibration and radiometric normalization of SAR data. Speckle filtering methods. Geometric corrections of SAR amplitude images. Analysis of SAR amplitude – flood monitoring, urban mapping. Coherence maps generation from SLC images.

LECTURES: Introduction to SAR remote sensing. SAR data acquisition. Key characteristics of amplitude SAR imagery. Thematic applications based on SAR amplitude. Interferometric SAR for DEM generation. DInSAR for deformation monitoring – concepts, procedure, discussion of examples, validation. Persistent Scatterer Interferometry – concepts, procedure/remarks, products, discussion of examples.

Learning purpose: Student has knowledge and skills in SAR remote sensing.

On completion of the study programme the graduate will gain:

Knowledge: Student has a wide-ranged knowledge of radar remote sensing.

Skills: Student has competence in SAR data processing for land use / land cover map compilation.

Social Competencies: Student is able to work efficiently in the team, organize team's cooperation during engineering projects.

- Basic literature: 1) Woodhouse I., Introduction to Microwave Remote Sensing, Taylor and Francis, 2006; 2) Veci L., SENTINEL-1 Toolbox. SAR Basics Tutorial, ESA, 2016; 3) Veci L., Sentinel-1 Toolbox. Interferometry Tutorial, ESA, 2016
 - Supplementary literature: 1) Richards J.A, Remote Sensing with Imaging Radar, Springer, 2009 2) Moreira et al. A Tutorial on Synthetic Aperture Radar. IEEE Geoscience and remote sensing magazine March 2013. 3) Soergel U. et al. Radar remote sensing of urban areas. Springer 2010. e-ISBN 978-90-481-3751-0
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The allocated number of ECTS points consists of:

Lectures and classes: 30 h

Student's independent work: 15 h